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EXAMINER	
HUGHES, SCOTT A	

ART UNIT	PAPER NUMBER
3663	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/597,227	WELKER ET AL.	
	Examiner	Art Unit	
	SCOTT A. HUGHES	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-69* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-69* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 June 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-69 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendments to the claims are sufficient to overcome the Wilson reference used in the 35 USC 102 rejections. As applicant has provided a declaration establishing common ownership/assignment of Wilson, applicant's argument that Wilson is not prior art under 35 USC 103 is persuasive. However, new grounds of rejection for the amended claims are presented below based upon Banbrook (5640325) and Vandenbroucke (6625083).

Applicant's amendments to the claims are sufficient to overcome the previous rejection of claims 3-7 under 35 USC 112 and the previous objection to claim 17.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 7-8, 10-19, 21-30, and 32-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Banbrook (5640325) in view of Vandenbroucke (6625083).

With regard to claim 1, Banbrook discloses an apparatus for use in a marine seismic survey (abstract; Column 1), comprising:

a seismic survey object (Fig. 1) (Column 3, Line 55 to Column 4, Line 36); and

an inertial measurement unit 20,22, 24,26,28 (Fig. 1) or 42,44,46,48,50 (Fig. 2) coupled to the seismic survey object at a known point and from which the movement of the seismic survey object can measured during a seismic survey such that the position of the known point during the marine seismic survey can be determined (Column 3, Line 61 to Column 4, Line 54; Column 5, Lines 8-44).

Banbrook does not disclose a short baseline acoustic system used with the seismic survey object and inertial measurement unit. Vandenbroucke discloses a marine seismic survey system used in seismic surveys that includes hydrophones (the sensor used in Banbrook) (Column 3, Line 43 to Column 4, Line 36). Although Banbrook discloses using the acoustic receivers for reflection surveys for locating without specifically mentioning that it is seismic surveying, Vandenbroucke teaches that it is known that the same sensors are used to take data in seismic reflection surveys. Vandenbroucke, like Banbrook, is also concerned with determining the position of the marine seismic survey equipment (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21). Vandenbroucke teaches that it is known to use short baseline or ultrashort baseline acoustic positioning systems in addition to other positioning means with the marine seismic survey system in order to determine the relative positions of each survey component to the other components (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21). It would have been obvious to modify Banbrook to include using short baseline or ultrashort baseline acoustic positioning systems with the survey components as taught by Vandenbroucke in order to determine the position of the

survey components relative to the vessel or other components in the survey so that the positions will be known for processing the data acquired.

With regard to claim 2, Banbrook discloses that the seismic survey object comprises one of a seismic cable, a seismic receiver, a steering device, and a seismic source (Column 3, Line 55 to Column 4, Line 21).

With regard to claim 3, Banbrook discloses that the seismic cable comprises one of a streamer and an ocean bottom cable (streamer) (Fig. 1) (Column 3, Line 55 to Column 4, Line 10).

With regard to claim 4, Banbrook discloses that the seismic cable includes one of a sensor module, a steering device, and an inertial positioning device in which the inertial measurement unit is housed (Column 3, Line 55 to Column 4, Line 36; Column 5).

With regard to claim 5, Banbrook discloses that the seismic cable includes a plurality of acoustic receivers (Column 1; Column 3, Lines 60-65).

With regard to claim 7, Banbrook does not disclose a seismic source that comprises at least one of an air gun and a vibrator. Vandenbroucke teaches that it is known to use seismic sources that are airguns in marine seismic surveys (Column 4, Lines 21-30). It would have been obvious to modify Banbrook to include an airgun source as taught by Vandenbroucke in order to be able to emit acoustic waves that can be used in the reflection surveys.

With regard to claim 8, Banbrook discloses an inertial positioning device in which the inertial measurement unit is housed (Column 3, Line 64 to Column 5, Line 65).

With regard to claim 10, Banbrook discloses that the inertial measurement unit comprises a plurality of accelerometers and gyroscopes (Column 5, Lines 1-8).

With regard to claim 11, Banbrook discloses that the inertial measurement unit comprises a micro-electromechanical inertial measurement unit (Column 5, Lines 1-6).

With regard to claim 12, Banbrook discloses that the inertial positioning device comprises an acoustic node determined by either an acoustic source or receiver (Column 1; Column 3, Line 55 to Column 4, Line 21).

With regard to claim 13, Vandenbroucke teaches that the acoustically determined point in marine seismic spreads comprises one of an ultra-short baseline acoustic system, a short baseline acoustic system, or a distance measurement acoustic system (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21).

With regard to claim 14, Banbrook discloses a marine seismic spread (abstract; Column 1), comprising:

a plurality of seismic survey objects, including a plurality of acoustic receivers distributed over a survey area from at least one known point (Fig. 1) (Column 1, Lines 15-33; Column 3, Line 55 to Column 4, Line 36); and

a plurality of inertial positioning devices 20,22, 24,26,28 (Fig. 1) or 42,44,46,48,50 (Fig. 2) coupled to the seismic survey objects at known points and capable of taking inertial measurements of the movement of the seismic survey objects

relative to the known point such that the position of the known points during the marine seismic survey can be determined (Column 3, Line 61 to Column 4, Line 54; Column 5, Lines 8-44).

Banbrook does not disclose a short baseline acoustic system used with the seismic survey object and inertial measurement unit. Vandenbroucke discloses a marine seismic survey system used in seismic surveys that includes hydrophones (the sensor used in Banbrook) (Column 3, Line 43 to Column 4, Line 36). Although Banbrook discloses using the acoustic receivers for reflection surveys for locating without specifically mentioning that it is seismic surveying, Vandenbroucke teaches that it is known that the same sensors are used to take data in seismic reflection surveys. Vandenbroucke, like Banbrook, is also concerned with determining the position of the marine seismic survey equipment (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21). Vandenbroucke teaches that it is known to use short baseline or ultrashort baseline acoustic positioning systems in addition to other positioning means with the marine seismic survey system in order to determine the relative positions of each survey component to the other components (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21). It would have been obvious to modify Banbrook to include using short baseline or ultrashort baseline acoustic positioning systems with the survey components as taught by Vandenbroucke in order to determine the position of the survey components relative to the vessel or other components in the survey so that the positions will be known for processing the data acquired.

Banbrook does not disclose that the survey objects include at least one seismic source in addition to the receivers. Vandenbroucke teaches that it is known to include a seismic source towed by a boat in order to emit acoustic waves for use in the seismic survey (Column 4, Lines 21-30). It would have been obvious to modify Banbrook to include a seismic source towed by the vessel in addition to the receivers as taught by Vandenbroucke in order to be able to emit waves so that reflections of the waves from the survey area can be obtained by the receivers to image or locate objects in the survey area.

With regard to claim 15, Banbrook discloses that the plurality of seismic survey objects include a plurality of seismic cables comprised of the acoustic sources and the inertial positioning devices (Figs. 1-2) (Column 4).

With regard to claim 16, Banbrook discloses that the seismic cables comprise a plurality of streamers (Column 3, Line 57 to Column 4, Line 21) (Figs. 1-2).

With regard to claim 17, Banbrook discloses that the seismic survey objects include a plurality of inertial positioning devices (Column 3, Line 61 to Column 4, Line 54; Column 5, Lines 8-44).

With regard to claim 18, Banbrook discloses that the plurality of acoustic receivers comprise a plurality of hydrophones or geophones (Column 1, Lines 15-33).

With regard to claim 19, Banbrook discloses that the inertial measurement unit is housed in an inertial positioning device housed (Column 3, Line 64 to Column 5, Line 65).

With regard to claim 21, Banbrook discloses that the inertial measurement unit comprises a plurality of accelerometers and gyroscopes (Column 5, Lines 1-8).

With regard to claim 22, Banbrook discloses that the inertial measurement unit comprises a micro-electromechanical inertial measurement unit (Column 5, Lines 1-6).

With regard to claim 23, Banbrook discloses that the inertial positioning device comprises an acoustic node determined by either an acoustic source or receiver (Column 1; Column 3, Line 55 to Column 4, Line 21).

With regard to claim 24, Vandenbroucke teaches that the acoustically determined point in marine seismic spreads comprises one of an ultra-short baseline acoustic system, a short baseline acoustic system, or a distance measurement acoustic system (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21).

With regard to claim 25, Banbrook discloses an apparatus for use in a marine seismic survey (abstract; Column 1), comprising:

a seismic survey cable (Fig. 1) (Column 3, Line 55 to Column 4, Line 36); and

an inertial measurement unit 20,22, 24,26,28 (Fig. 1) or 42,44,46,48,50 (Fig. 2) coupled to the seismic survey cable at a known point and from which the movement of the seismic survey cable can measured during a seismic survey such that the position of the known point during the marine seismic survey can be determined (Column 3, Line 61 to Column 4, Line 54; Column 5, Lines 8-44).

Banbrook does not disclose a short baseline acoustic system used with the seismic survey object and inertial measurement unit. Vandenbroucke discloses a marine seismic survey system used in seismic surveys that includes hydrophones (the

sensor used in Banbrook) (Column 3, Line 43 to Column 4, Line 36). Although Banbrook discloses using the acoustic receivers for reflection surveys for locating without specifically mentioning that it is seismic surveying, Vandenbroucke teaches that it is known that the same sensors are used to take data in seismic reflection surveys. Vandenbroucke, like Banbrook, is also concerned with determining the position of the marine seismic survey equipment (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21). Vandenbroucke teaches that it is known to use short baseline or ultrashort baseline acoustic positioning systems in addition to other positioning means with the marine seismic survey system in order to determine the relative positions of each survey component to the other components (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21). It would have been obvious to modify Banbrook to include using short baseline or ultrashort baseline acoustic positioning systems with the survey components as taught by Vandenbroucke in order to determine the position of the survey components relative to the vessel or other components in the survey so that the positions will be known for processing the data acquired.

With regard to claim 26, Banbrook discloses that the seismic cable comprises one of a streamer and an ocean bottom cable (streamer) (Fig. 1) (Column 3, Line 55 to Column 4, Line 10).

With regard to claim 27, Banbrook discloses that the seismic cable includes one of a sensor module, a steering device, and an inertial positioning device in which the inertial measurement unit is housed (Column 3, Line 55 to Column 4, Line 36; Column 5).

With regard to claim 28, Banbrook discloses that the seismic cable includes a plurality of acoustic receivers (Column 1; Column 3, Lines 60-65).

With regard to claim 29, Banbrook discloses that the plurality of acoustic receivers comprise a plurality of hydrophones or a plurality of geophones Column 1, Lines 15-33).

With regard to claim 30, Banbrook discloses that the inertial measurement unit is housed within an inertial positioning device (Column 3, Line 64 to Column 5, Line 65).

With regard to claim 32, Banbrook discloses that the inertial measurement unit comprises a plurality of accelerometers and gyroscopes (Column 5, Lines 1-8).

With regard to claim 33, Banbrook discloses that the inertial measurement unit comprises a micro-electromechanical inertial measurement unit (Column 5, Lines 1-6).

With regard to claim 34, Banbrook discloses that the inertial positioning device comprises an acoustic node determined by either an acoustic source or receiver (Column 1; Column 3, Line 55 to Column 4, Line 21).

With regard to claim 35, Vandenbroucke teaches that the acoustically determined point in marine seismic spreads comprises one of an ultra-short baseline acoustic system, a short baseline acoustic system, or a distance measurement acoustic system (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21).

With regard to claim 36, Banbrook discloses a method for use in a marine seismic survey (abstract; Column 1), comprising:

taking inertial measurements of movement of selected points 20,22,24,26,28 (Fig. 1) on a seismic spread relative to at least one known point (Fig. 1) (Column 3, Line 61 to Column 4, Line 54; Column 5, Lines 8-44); and

applying the inertial measurements to the known point to determine the positions of the selected points (Column 3, Line 61 to Column 4, Line 54; Column 5, Lines 8-44).

Banbrook does not disclose a short baseline acoustic system used with the seismic survey objects and inertial measurements. Vandenbroucke discloses a marine seismic survey system used in seismic surveys that includes hydrophones (the sensor used in Banbrook) (Column 3, Line 43 to Column 4, Line 36). Although Banbrook discloses using the acoustic receivers for reflection surveys for locating without specifically mentioning that it is seismic surveying, Vandenbroucke teaches that it is known that the same sensors are used to take data in seismic reflection surveys. Vandenbroucke, like Banbrook, is also concerned with determining the position of the marine seismic survey equipment (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21). Vandenbroucke teaches that it is known to use short baseline or ultrashort baseline acoustic positioning systems in addition to other positioning means with the marine seismic survey system in order to determine the relative positions of each survey component to the other components (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21). It would have been obvious to modify Banbrook to include using short baseline or ultrashort baseline acoustic positioning systems with the survey components as taught by Vandenbroucke in order to determine the position of the

survey components relative to the vessel or other components in the survey so that the positions will be known for processing the data acquired.

With regard to claim 37, Banbrook discloses that taking the inertial measurements includes taking the inertial measurements during at least one of deploying the spread, retrieving the spread and conducting a survey (Column 4, Lines 40-54).

With regard to claim 38, Banbrook does not disclose supplementing the inertial measurements. Vandenbroucke teaches that it is known to supplement positioning measurements of marine seismic survey equipment (Column 4). It would have been obvious to modify Banbrook to include supplementing the inertial measurements as taught by Vandenbroucke in order to obtain accurate position measurements of the survey equipment in relation to the other equipment used in the survey.

With regard to claim 39, Vandenbroucke teaches that supplementing the inertial measurements comprises at least one of calibrating the positions using a coordinate history determined from acoustic ranging signals and integrating one dimensional measures (Column 4).

With regard to claim 40, Banbrook discloses deploying the seismic spread at the known point (Column 1; Column 2, Line 41 to Column 3, Line 23; Column 4, Line 55 to Column 5, Line 26).

With regard to claim 41, Banbrook discloses that deploying the seismic spread at the known point includes one of deploying the seismic spread to the bottom of a body of

water and deploying the seismic spread near to the surface of the body of water (discloses deploying near the surface) (Figs. 1-2) (Column 1).

With regard to claim 42, Banbrook discloses that deploying the seismic spread at the known point includes deploying the seismic spread in one of saltwater, fresh water, and brackish water (Column 1).

With regard to claim 43, Banbrook discloses housing an inertial measurement unit in a seismic survey object (Column 3, Line 64 to Column 5, Line 65).

With regard to claim 44, Banbrook discloses that housing the inertial measurement unit in a seismic survey object includes housing the inertial measurement unit in one of a seismic cable, a seismic receiver, a steering device, and a seismic source (Column 3, Line 55 to Column 4, Line 36; Column 5).

With regard to claim 45, Banbrook discloses that taking inertial measurements of the movement of selected points on the seismic spread includes taking inertial measurements of the movement of selected seismic survey objects (Column 3, Line 55 to Column 5, line 10).

With regard to claim 46, Banbrook discloses that taking inertial measurements of the movement of selected seismic survey objects includes taking inertial measurements of the movement of at least one of a seismic cable, a seismic receiver, a steering device, and a seismic source (Column 3, Line 55 to Column 5, Line 10).

With regard to claim 47, Banbrook discloses that the seismic cable includes seismic survey objects having known relative orientations with respect to the selected points on the seismic cable, and the method further comprises determining positions of

the selected seismic survey objects based on the determined positions of the selected points and the known relative orientations (Column 4, Lines 11-54; Column 5, Lines 8-65; Column 6, Lines 44-65).

With regard to claim 48, Banbrook discloses a method for use in a marine seismic survey (abstract; Column 1), comprising:

deploying a seismic cable at a known point (Figs. 1-2) (Column 3, Line 55 to Column 4, Line 21);

taking inertial measurements of movement of selected points on the seismic cable relative to the known point during the deployment (Column 3, Line 55 to Column 5, Line 10; Column 5, Line 45 to Column 6, Line 18); and

applying the inertial measurements to the known point to determine the positions of the selected points (Column 3, Line 55 to Column 5, Line 10; Column 5, Line 45 to Column 6, Line 18).

Banbrook does not disclose a short baseline acoustic system used with the seismic survey cable and inertial measurements. Vandenbroucke discloses a marine seismic survey system used in seismic surveys that includes hydrophones (the sensor used in Banbrook) (Column 3, Line 43 to Column 4, Line 36). Although Banbrook discloses using the acoustic receivers for reflection surveys for locating without specifically mentioning that it is seismic surveying, Vandenbroucke teaches that it is known that the same sensors are used to take data in seismic reflection surveys. Vandenbroucke, like Banbrook, is also concerned with determining the position of the marine seismic survey equipment (Column 1, Line 60 to Column 2, Line 10; Column 4,

Lines 4-21). Vandenbroucke teaches that it is known to use short baseline or ultrashort baseline acoustic positioning systems in addition to other positioning means with the marine seismic survey system in order to determine the relative positions of each survey component to the other components (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21). It would have been obvious to modify Banbrook to include using short baseline or ultrashort baseline acoustic positioning systems with the survey components as taught by Vandenbroucke in order to determine the position of the survey components relative to the vessel or other components in the survey so that the positions will be known for processing the data acquired.

With regard to claim 49, Banbrook discloses that the seismic cable includes seismic survey objects having known relative orientations with respect to the selected points on the seismic cable, and the method further comprises determining positions of the selected seismic survey objects based on the determined positions of the selected points and the known relative orientations (Column 4, Lines 11-54; Column 5, Lines 8-65; Column 6, Lines 44-65).

With regard to claim 50, Banbrook discloses that deploying the seismic cable comprises one of deploying the seismic cable to the bottom of the water and deploying the seismic cable near to the surface of the water (Figs. 1-2) (Column 1).

With regard to claim 51, Banbrook does not disclose supplementing the inertial measurements. Vandenbroucke teaches that it is known to supplement positioning measurements of marine seismic survey equipment (Column 4). It would have been obvious to modify Banbrook to include supplementing the inertial measurements as

taught by Vandenbroucke in order to obtain accurate position measurements of the survey equipment in relation to the other equipment used in the survey.

With regard to claim 52, Vandenbroucke teaches that supplementing the inertial measurements comprises at least one of calibrating the positions using a coordinate history determined from acoustic ranging signals and integrating one dimensional measures (Column 4).

With regard to claim 53, Banbrook discloses that deploying the seismic cable at the known point includes one of deploying the seismic cable to the bottom of a body of water and deploying the seismic cable near to the surface of the body of water (Column 1) (Figs. 1-2).

With regard to claim 54, Banbrook discloses that deploying the seismic cable at the known point includes deploying the seismic cable in one of saltwater, fresh water, and brackish water (Column 1).

With regard to claim 55, Banbrook discloses housing an inertial measurement unit in a seismic survey object comprising a portion of the seismic cable (Column 3, Line 64 to Column 5, Line 65).

With regard to claim 56, Banbrook discloses that housing the inertial measurement unit in a seismic survey object includes housing the inertial measurement unit in one of a seismic receiver, a steering device, and a seismic source (Column 3, Line 55 to Column 4, Line 36; Column 5).

With regard to claim 57, Banbrook discloses that taking inertial measurements of the movement of selected points on the seismic cable includes taking inertial

measurements of the movement of selected seismic survey objects comprising a portion of the seismic cable (Column 3, Line 55 to Column 5, line 10) (Figs. 1-2).

With regard to claim 58, Banbrook discloses that taking inertial measurements of the movement of selected seismic survey objects includes taking inertial measurements of the movement of at least one of a seismic cable, a seismic receiver, a steering device, and a seismic source (Column 3, Line 55 to Column 5, Line 10).

With regard to claim 59, Banbrook discloses a method for use in a marine seismic survey (abstract; Column 1), comprising:

conducting a survey with a seismic spread deployed from at least one known point ((Figs. 1-2) Column 3, Line 55 to Column 4, Line 21);

taking inertial measurements of movement of selected points on the seismic spread relative to the known point during the conduct of the seismic survey (Column 3, Line 55 to Column 5, Line 10; Column 5, Line 45 to Column 6, Line 18); and

applying the inertial measurements to the known point to determine the positions of the selected points (Column 3, Line 55 to Column 5, Line 10; Column 5, Line 45 to Column 6, Line 18).

Banbrook does not disclose a short baseline acoustic system used with the seismic survey spread and inertial measurements. Vandenbroucke discloses a marine seismic survey system used in seismic surveys that includes hydrophones (the sensor used in Banbrook) (Column 3, Line 43 to Column 4, Line 36). Although Banbrook discloses using the acoustic receivers for reflection surveys for locating without specifically mentioning that it is seismic surveying, Vandenbroucke teaches that it is

known that the same sensors are used to take data in seismic reflection surveys. Vandenbroucke, like Banbrook, is also concerned with determining the position of the marine seismic survey equipment (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21). Vandenbroucke teaches that it is known to use short baseline or ultrashort baseline acoustic positioning systems in addition to other positioning means with the marine seismic survey system in order to determine the relative positions of each survey component to the other components (Column 1, Line 60 to Column 2, Line 10; Column 4, Lines 4-21). It would have been obvious to modify Banbrook to include using short baseline or ultrashort baseline acoustic positioning systems with the survey components as taught by Vandenbroucke in order to determine the position of the survey components relative to the vessel or other components in the survey so that the positions will be known for processing the data acquired.

With regard to claim 60, Banbrook does not disclose supplementing the inertial measurements. Vandenbroucke teaches that it is known to supplement positioning measurements of marine seismic survey equipment (Column 4). It would have been obvious to modify Banbrook to include supplementing the inertial measurements as taught by Vandenbroucke in order to obtain accurate position measurements of the survey equipment in relation to the other equipment used in the survey.

With regard to claim 61, Vandenbroucke teaches that supplementing the inertial measurements comprises at least one of calibrating the positions using a coordinate history determined from acoustic ranging signals and integrating one dimensional measures (Column 4).

With regard to claim 62, Banbrook discloses deploying the seismic spread at the known point (Figs. 1-2) (Column 3, Line 55 to Column 4, Line 21).

With regard to claim 63, Banbrook discloses that deploying the seismic cable at the known point includes one of deploying the seismic cable to the bottom of a body of water and deploying the seismic cable near to the surface of the body of water (Column 1) (Figs. 1-2).

With regard to claim 64, Banbrook discloses that deploying the seismic cable at the known point includes deploying the seismic cable in one of saltwater, fresh water, and brackish water (Column 1).

With regard to claim 65, Banbrook discloses housing an inertial measurement unit in a seismic survey object comprising a portion of the seismic cable (Column 3, Line 64 to Column 5, Line 65).

With regard to claim 66, Banbrook discloses that housing the inertial measurement unit in a seismic survey object includes housing the inertial measurement unit in one of a seismic receiver, a steering device, and a seismic source (Column 3, Line 55 to Column 4, Line 36; Column 5).

With regard to claim 67, Banbrook discloses that taking inertial measurements of the movement of selected points on the seismic cable includes taking inertial measurements of the movement of selected seismic survey objects comprising a portion of the seismic cable (Column 3, Line 55 to Column 5, line 10) (Figs. 1-2).

With regard to claim 68, Banbrook discloses that taking inertial measurements of the movement of selected seismic survey objects includes taking inertial measurements

of the movement of at least one of a seismic cable, a seismic receiver, a steering device, and a seismic source (Column 3, Line 55 to Column 5, Line 10).

With regard to claim 69, Banbrook discloses that the seismic cable includes seismic survey objects having known relative orientations with respect to the selected points on the seismic cable, and the method further comprises determining positions of the selected seismic survey objects based on the determined positions of the selected points and the known relative orientations (Column 4, Lines 11-54; Column 5, Lines 8-65; Column 6, Lines 44-65).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Banbrook in view of Vandenbroucke as applied above, and further in view of Ambs (6011752).

With regard to claim 6, Banbrook does not disclose a steering device that comprises one of a Q-fin and a bird. Banbrook discloses inertial measurement units on the cable, but does not disclose that the cable also includes steering devices where the inertial measurements units could be. Ambs teaches that it is known to include steering devices of birds that include position measurement equipment on seismic streamers (abstract; Columns 5-6). It would have been obvious to modify Banbrook to include birds on the streamer as taught by Ambs in order to be able to be able to control the position of the streamer so that it is at desired positions for the survey.

Claims 9, 20, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Banbrook in view of Vandenbroucke as applied above, and further in view of Burke (5739787).

With regard to claims 9, 20 and 31, Banbrook discloses that the inertial positioning device further comprises:

a power system for the inertial measurement unit (Column 4, Line 61 to Column 5, Line 40);

a communication interface (communication back to the vessel) (Column 4, Line 61 to Column 5, Line 40); but does not disclose a battery powering the power system and the communication interface.

Banbrook discloses inertial measurement units, but does not disclose specifics as to how these sensors are powered. Burke teaches that it is known to power inertial measurement devices using battery power (Column 7, Line 38 to Column 8, Line 30). It would have been obvious to modify Banbrook to include a battery to power the units as taught by Burke in order to have a portable and local power source for each unit.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SCOTT A. HUGHES whose telephone number is (571)272-6983. The examiner can normally be reached on M-F 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Scott A. Hughes/
Examiner, Art Unit 3663